

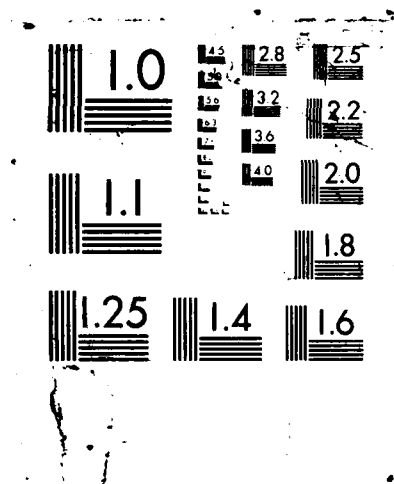
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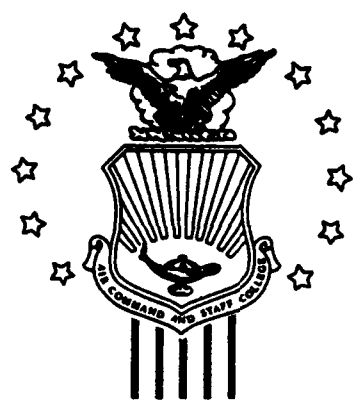
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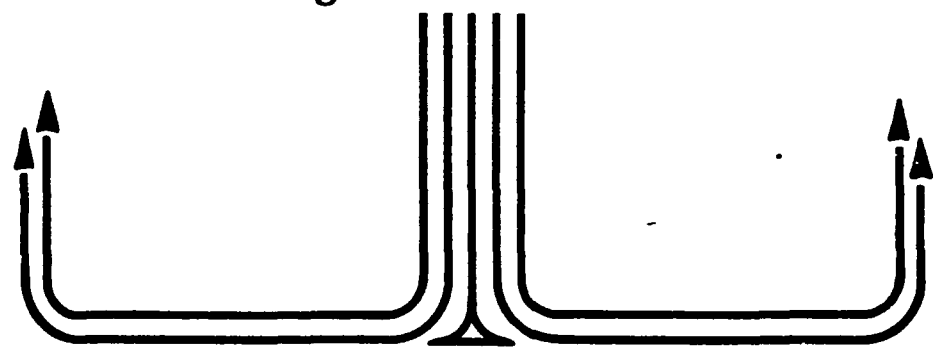
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# AIR COMMAND AND STAFF COLLEGE

## STUDENT REPORT

THE USER AND  
THE SYSTEM PROGRAM OFFICE:  
A CRITICAL INTERFACE

MAJ HENRY A. OBERING III 88-2005  
"insights into tomorrow"



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**AUTHOR(S)** MAJOR HENRY A. OBERING III, USAF

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## PREFACE

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This material is designed for incorporation into the ACSC curriculum block of instruction entitled, "The User and System Acquisition ". Subject to clearance, the manuscript contained in Part One of the material will be submitted to Major Michael White, ACSC/EDM for consideration of publication by the Air University Press.

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## ABOUT THE AUTHOR

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Major Henry A. Obering III has served both in the user and system acquisition communities. After his commissioning in the Air Force and graduation from UPT in 1974, Major Obering flew the F4-E aircraft until his flight medical disqualification in 1978. He then attended Stanford University, California, where he received his Master of Science Degree in Astronautical Engineering in 1980. Following graduation, he was assigned to the Air Force Systems Command's Space Shuttle Test Group at Vandenberg AFB where he participated in the acquisition and construction of the west coast Space Shuttle launch site. In 1982, Major Obering was assigned to Kennedy Space Center, Florida, as a member of NASA's Shuttle launch operations team. After participating in 15 successful Shuttle launches, he was reassigned in 1985 to Vandenberg AFB to develop the first Air Force Shuttle launch operations team. Major Obering's last position at Vandenberg prior to coming to ACSC was Director, Shuttle Engineering Directorate, Vandenberg Launch Site Program Office. Major Obering is an graduate of the Program Manager's Course, Defense Systems Management College, Class 84-2.





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88-2005

### AUTHOR(S)

MAJOR HENRY A. OBERING III, USAF

### TITLE

THE USER AND THE SYSTEM PROGRAM OFFICE: A CRITICAL INTERFACE

I. Purpose: To provide material for incorporation into the ACSC curriculum which examines the roles and responsibilities of the system program office (SPO) with respect to the user throughout the system acquisition process and investigates the criticality of communication across this interface.

II. Problem: Can a paper be written to concisely detail the complex relationship between a SPO and its user with respect to roles and responsibilities and provide recommendations for enhancing communication across this interface ?

III. Data: In each phase of the acquisition process, both the SPO and user have vital communication roles to play to ensure the successful design, development, and deployment of a modern weapon system. Beginning with the initiation of the acquisition process in the concept exploration/definition phase, the SPO must fully understand the operational needs of the user in filling a "gap" in his force capability as defined in the Statement of Operational Need (SON). The SPO

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## CONTINUED

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must also comprehend the manner in which the weapon system is to be fielded and the resources the user has to maintain and operate the system as depicted in the System Operational Requirements Document (SORD). With this information, the SPO defines the acquisition strategy to be followed in the development of the new system and the milestone schedule necessary to achieve the user's required initial operational capability (IOC) of the system. The SPO and the user enter into a "contract" with this information and the program is formally baselined.

In the concept demonstration/validation phase, the user/SPO communication is centered on the reduction of both technical and schedule risk in deciding which system alternative to carry into full scale production. It becomes essential for the user to participate in the contractor source selection process for their operational expertise and perspective. It is also during the concept demonstration/validation phase that the development and operational testing programs are initiated with both user and SPO personnel participating. Again, it is imperative that the two organizations share test data and results to ensure proper design refinement based on operational considerations. The bottomline in this phase is for the SPO and user to communicate properly to guarantee the best possible decision is made in selecting the system alternative for full scale development.

The SPO and user must interface across a broad range of areas during full scale development and initial production. The user should become involved in the design development characterized by the preliminary design reviews and critical design reviews of each facet of the weapon system. This knowledge is invaluable in the development of the user's training profiles and programs to support the system's operational deployment. In addition, the user and the SPO must communicate in the system's configuration management process. In this arena, the user plays a vital role in providing an operational perspective for configuration change requests decisions. The other major area of the SPO/user interface in this phase is logistics support planning and acquisition. The SPO and user must work closely to ensure that the weapon system has the proper logistics support objectives, resources, maintenance approach, etc. These items are defined and detailed in the Integrated Logistics Support Plan (ILSP). Using this information, the user updates the SORD and the program enters the full rate production/deployment phase.

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## CONTINUED

With the acquisition process entering the full rate production/deployment phase, the user and SPO begin to drastically change their relationship. With the weapon system nearing its full maturity, the program undergoes program management responsibility transfer (PMRT) which changes the role of the SPO from program control to program support and intensifies the role of the supporting command to conduct engineering and configuration management for the life of the system. The user must establish new interfaces with the supporting command for the information flow necessary for sustaining operations and maintenance of the weapon system.

IV. Conclusions: A concise paper can be written to examine the roles and responsibilities of the SPO with respect to the user and present the criticality of communication across this interface. Furthermore, in today's acquisition environment of complex weapon systems and costly components, a "team spirit" must prevail between the SPO and the user. This spirit can only be achieved through knowledge of each organization's objectives, constraints, and resources.

V. Recommendations: The knowledge required by both SPO and user personnel should be attained through use of existing AFIT training courses, SPO participation in user exercises, mandatory user participation in SPO mid-level decision-making, and formalized documentation of the required interaction between the SPO and the user.

## Part One

### THE USER AND THE SYSTEM PROGRAM OFFICE: A CRITICAL INTERFACE

#### Introduction

In April 1986, a Presidential Blue Ribbon Commission on Defense Management presented its findings on the defense acquisition system which had been "shaken by a spate of horror stories" (3:70). One of its primary findings was the necessity for clear cut communications between the acquisition system program office (SPO) and the user of that system (3:79).

This paper will examine the roles and responsibilities of the SPO with respect to the user throughout the system acquisition process and investigate the criticality of communication across this complex interface. The discussion will be structured using the framework of the system acquisition phases: concept exploration/ definition, concept demonstration/validation, full scale development, full rate production, and deployment to initial operational capability through operational support.

In order to facilitate the discussion, a number of definitions are required. The user of a system or using command referred to in the paper is usually one of the major operational commands (TAC, SAC, MAC, etc.). The supporting command is Air Force Logistics Command. The implementing command responsible for the acquisition of the system is normally Air Force Systems Command (AFSC). The program manager is an individual chartered by the implementing command by a Program Management Directive (PMD) to manage a weapon system acquisition. The PMD defines authority, specifies requirements for program management, requests special studies, initiates, approves, changes, transitions, modifies, and terminates programs (4:2). The SPO referred to earlier is the organization consisting of technical, business management, and administrative personnel assigned to the program manager to conduct his/her responsibilities. A typical SPO organization is depicted in figure 1 and the SPO/user interface is depicted in figure 2. Communication across this interface is typically heaviest during the concept exploration/definition phase.

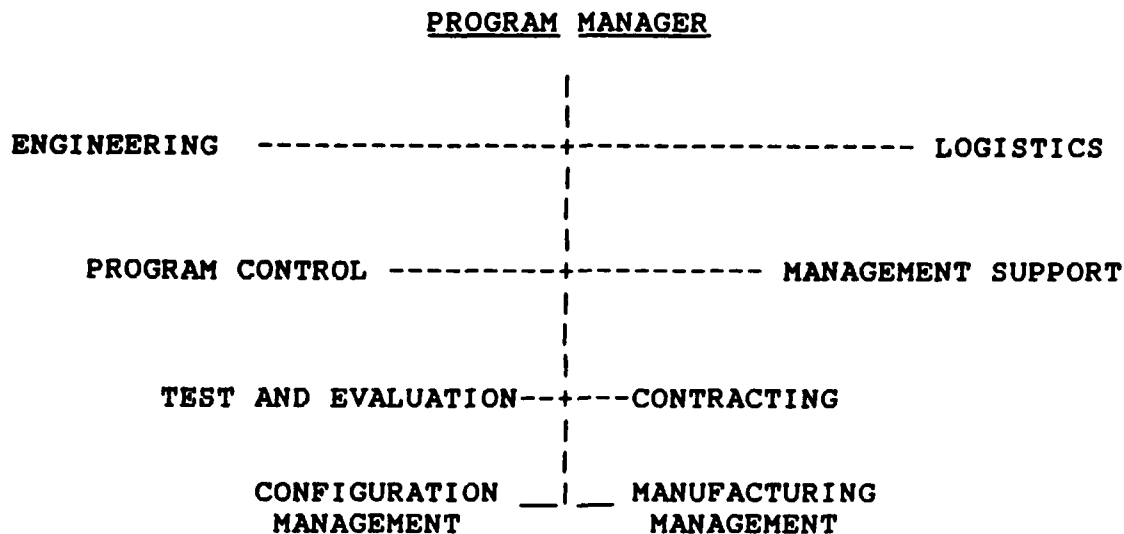


FIGURE 1. TYPICAL SPO ORGANIZATION

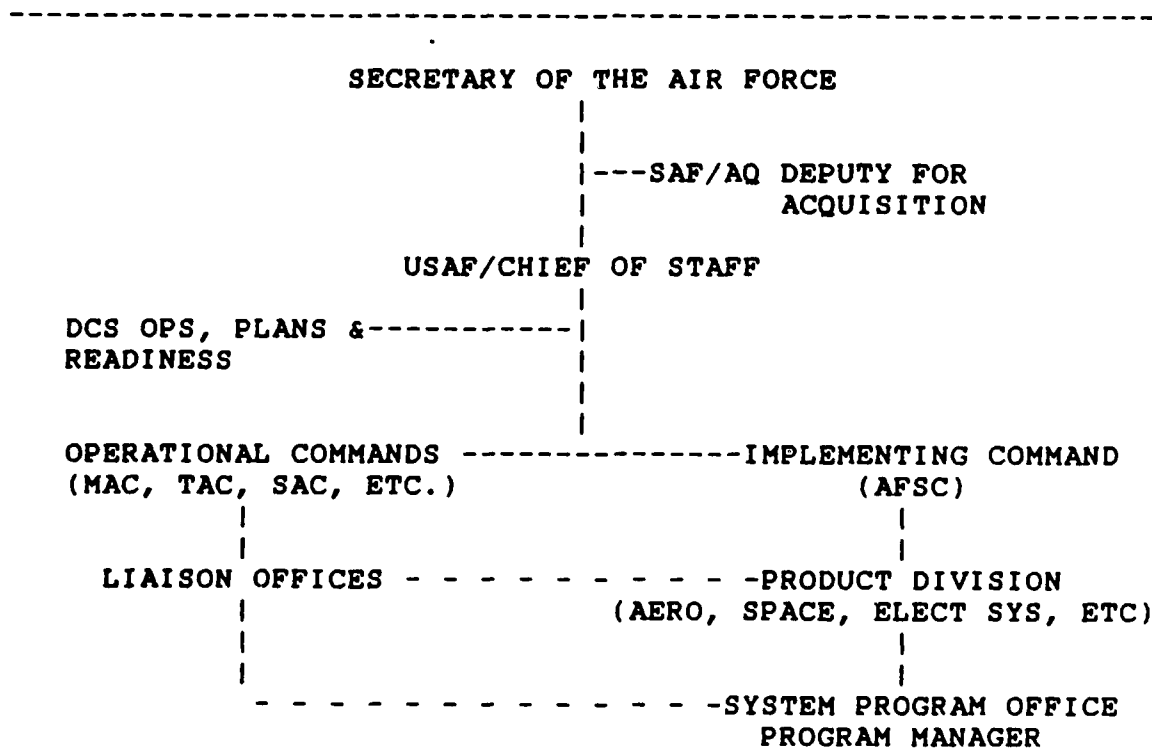


FIGURE 2. USER/SPO INTERFACE

## The User and the Program Office - Concept Exploration/ Definition

The initiation of the system acquisition process is an opportunity for setting the stage for effective user/SPO communication. This communication is essential in defining exactly what the user needs, what weapon system alternatives may be developed to meet the needs, and finally, how a weapon system will be operated and supported in the "field". To initiate this communication process the SPO is required to completely understand the operational needs defined by the using command to fill a "gap" in his force capability; exploit an opportunity provided by technology or an enemy deficiency; or to reduce the costs of an existing weapon system (14:III-1). These deficiencies and opportunities are exposed as a result of a comprehensive analysis by the user known as a "Mission Area Analysis". This analysis examines the user's mission tasks and assesses the capability of the user to accomplish these tasks in view of the current and projected threat, operational environment, and other limitations (14:III-1).

The culmination of this analytical process is the "Statement of Operational Need" (SON). According to AFR 57-1, the SON has three primary uses: it defines an operational need, obtains official validation of that need, and furnishes preliminary guidance for planning to the implementing command. The coordination and publication of the SON is the primary tool of the user to communicate its needs directly to the implementing command and therefore to the SPO. The SON specifies the operational needs of a system but does not specify a particular weapon system as a solution. The operational needs are identified in terms of "mission requirements, operational objectives, employment concepts, and support and maintenance concepts" (7:2).

The program manager uses the SON and his/her PMD to develop the acquisition strategy for the program. This strategy will consist of the technical, business, and management aspects of the program. The program manager will coordinate the selected strategy with the appropriate user liaison office (figure 2) to ensure compatibility of the strategy with operational considerations. Based on the acquisition strategy, the SPO will initiate the development of several concepts capable of fulfilling the specified user's need.

As each weapon system option is developed by the SPO, a projection of how that option may be deployed, employed, and supported is described by the user. This document is known as a System Operational Requirements Document (SORD). For each system option provided by the SPO, the user describes in the SORD the anticipated quantity of weapon systems to be

procured, anticipated operating environment, pertinent performance requirements, reliability and maintenance factors, and support parameters (11:33). The SORD provides the user with a forum for assessing each option from its vantage point. The SPO uses the SORD to identify the technical feasibility of the operational and support concepts. In addition, the SPO identifies problem or high-risk areas which would jeopardize the system's development costs or schedule (8:6).

The most important use of the SORD by the SPO is to translate the user's operational and support concepts along with the system designs into a program baseline. This program baseline is a "contract" between the program manager, the implementing command and the using command which defines the weapon system as it develops throughout the acquisition process. The baseline which is developed during the concept exploration/definition phase is the "functional" baseline. The functional baseline defines the performance requirements to be met by the weapon system as a whole, not individual system components. As an example, the functional baseline would describe the range, airspeed, and turn rate requirements of a new aircraft but would not describe the required performance of the engine, airframe, aileron travel rate, landing gear deployment speed, etc. to meet the system level requirements.

Additional facets of this "contract" are the schedule and cost baselines. The cost baseline does not directly affect the user; however, if the costs become significantly out of limits, the entire acquisition could be endangered. In addition, the costs are of prime importance to the program manager in the decision making process which will be discussed later. The program manager and the user "contract" for delivery of the proposed weapon system using a schedule baseline which provides a date for initial operational capability (IOC) of the system. Meeting the IOC deadline is critical in the acquisition process and directly impacts the user in satisfying its operational need. IOC will be discussed in more detail in the deployment section of this paper. In fulfilling his/her portion of the contract, the program manager must balance cost, schedule, and technical performance issues to provide the user with an effective weapon system on schedule and within budget. When any of the agreed upon parameters of cost, schedule, or performance are changed significantly, the contract must be "renegotiated" between the various parties. In the event of conflict between the user and the SPO in this negotiation, several avenues are available for resolution. As depicted in figure 2, the program manager and the user both have four star support at the MAJCOM level. Communication lines are provided by the liaison offices working with the product divisions and the normal chain of command.

At predetermined points in the system acquisition development, a complete assessment of the program is conducted at the SECDEF or SAF level to ensure program cost, schedule, and performance objectives are being met. This assessment is known as the "milestone review process". After program initiation and entry into the concept exploration/definition phase at Milestone 0, the remaining predetermined points are:

- o Milestone I - entry into the concept demonstration/validation phase,
- o Milestone II - entry into full scale development and, as required, low rate initial production,
- o Milestone III - entry into full rate production and initial deployment,
- o Milestone IV - operational readiness and support review (1 to 2 years after initial deployment),
- o Milestone V - operational effectiveness and suitability review (5 to 10 years after initial deployment) (13:3-4).

In addition to reviewing the progress of the program, the milestone review process resolves conflicts between the user and the SPO.

As the concept exploration/definition phase concludes, the user has updated the mission area analysis and threat scenario, identified his operational need, completed the SORD to define the expected operational environment, and concurred in the acquisition strategy. Likewise, once the SPO has sufficiently "scrubbed" user requirements, developed the acquisition strategy, identified major areas of risk, and selected several weapon system alternatives, the program is ready to proceed to the concept demonstration/validation phase.

#### The User and the Program Office - Concept Demonstration/Validation

The primary focus of the user/SPO relationship during the concept demonstration/validation phase is to determine which of the weapon system candidates will be selected for full scale development and eventual production. This is accomplished by increased definition of the alternate designs and expanded testing to reduce risk even further. The increased definitization effort is normally accomplished by defense contractors (14:V-5).



The selection of the defense contractors is one of the first tasks required of the SPO in the concept demonstration/validation phase. This contract award process is known as "source selection". The objective of the source selection process is to choose the contractor who has the highest probability of satisfying the performance and schedule requirements of the weapon system acquisition at the most advantageous cost to the government (10:I-2). The government initiates the process by issuing Request for Proposals (RFP) that solicit for competitive contract proposals. A source selection team then reviews, evaluates, and compares the contractors' responses. After this extensive examination, the source selection team recommends contract awards to the source selection authority (usually the Secretary of the Air Force or his delegated representative) who makes the final decision. Source selection occurs for every major contract throughout a system acquisition with the SPO and the using command playing vital roles in the process. The SPO develops the plan for implementing the source selection process and ensures that the source selection team members understand their responsibilities. The using command provides qualified members to the team to provide expertise in the areas of operational needs to be satisfied by the weapon system, the deployment and operational concepts developed for the system, and the operational testing program to be used in evaluating the system (10:Chap V).

As mentioned earlier, the other important facet of the SPO/user interface during the concept demonstration/validation phase is the testing program. The primary purpose of the testing program is to reduce the risk of the weapon system not meeting its performance requirements in the operational environment (14:IV-1). In order to achieve this purpose, three types of test programs are conducted: developmental test and evaluation (DT&E), operational test and evaluation (OT&E), and production acceptance test & evaluation (PAT&E). The system's initial testing, DT&E, assesses the weapon system's capability to meet the technical performance requirements and specifications. This assessment includes components, subsystems, prototypes, and hardware/software integration (2:--). After developmental testing has determined the system's basic safety, operational testing may begin. OT&E evaluates the weapon system's capability to meet its operational effectiveness and suitability. This includes system survivability, vulnerability, expected mission accomplishment, reliability, maintainability, supportability, ease of training, transportability, wartime usage, etc. PAT&E consists of quality control testing of production components to their specifications. Production testing comes into play in the production phase of the acquisition and will not be examined in this paper.

The SPO and the user have differing responsibilities and roles in the conduct of the test program. The SPO is responsible for the management and conduct of development and production testing while the user conducts the initial operational testing and evaluation (IOT&E) under the management of the Air Force Operational Test and Evaluation Center (AFOTEC). Normally in the full scale development phase, the user will perform follow-on operational test and evaluation (FOT&E). In the conduct of DT&E, the SPO must work closely with the user to allow the required flow of information necessary to ensure proper system performance. For example, DT&E will identify possible deficiencies in the system or the system's specifications early in the design development. This data could indicate a required trade-off in system performance with the resultant impact on the system's operability, maintainability, reliability, etc. Additionally, DT&E provides data which the user can use to estimate the system's survivability, interoperability, training requirements, logistic supportability, etc (14:IV-3). The importance of this communication flow was highlighted in April, 1986, by the Presidential Blue Ribbon Commission on Defense Management. When describing an acquisition model to emulate it stated, "Generally, when developmental problems arise, performance trade-offs are made-with the user's concurrence-in order to protect cost and schedule. As a result, a program manager is motivated to seek out and address problems, rather than hide them" (3:79). Conversely, the user must work closely with the SPO in the conduct of OT&E. The operational testing program will identify system operational deficiencies which could be communicated to the SPO and resolved with design changes or trade-offs. This feedback mechanism is also critical in updating the system's cost and schedule baselines which the SPO manages. Management planning for all three types of testing is detailed in the Test and Evaluation Master Plan (TEMP) which the SPO produces with inputs from the participating agencies (user, AFOTEC, etc.). The TEMP addresses system and mission description, test and evaluation schedules, status and plans for development, operational and production testing, critical test and evaluation issues, and test resource requirements. Once the TEMP is approved (usually prior to Milestone I) it establishes a "contract" for the conduct of testing for the entire system acquisition (1:--).

The testing program provides the user with valuable information required to update the System Operational Requirements Document (SORD) which was developed in concept exploration phase. The using command prepares an updated SORD for each system alternative prior to Milestone II. The SORD details "specific quantitative and qualitative factors

relating to the performance requirements and support parameters of a particular system" (8:2). These factors include user program requirements, operational characteristics and capabilities, adverse mission conditions, counter-countermeasures, training requirements, reliability and maintainability factors and interoperability attributes of the system (8:5). The SPO, on the other hand, identifies high-risk areas and deficiencies to the user for consideration in the preparation of the SORD, translates design, operational, and support concepts into the program baseline, and ensures that the requirements of the SORD continue to be satisfied throughout the development of the weapon system (8:6).

The defense contractors chosen in the source selection process normally evolve a system prototype for each alternative. These prototypes are competitively compared to determine the best solution for the user's operational need. The program office's developmental testing and initial operational testing by the user yields valuable performance data and operational effectiveness estimates which are used to determine the proper weapon system alternative for full scale production. Armed with the test data, development specifications and updated SORD, the SPO/user team is ready to meet Milestone II - Full Scale Development approval.

#### The User and the Program Office - Full Scale Development and Initial Production

The most critical phases of a system acquisition are full scale development and production. In these phases, it is essential for the user to be fully integrated in the system's specification development, configuration management, logistics support planning, and product baselining for production. With the technical risk minimized after the concept demonstration/validation phase, the program office turns its attention to determining the production specifications of the weapon system.

The maturation of the design into production specifications utilizes a formal review process. The Preliminary Design Review is conducted at approximately the 30% completion point and the Critical Design Review (CDR) occurs normally at the 60-90% completion stage (15:--). The reviews are chaired by program office personnel and are held for sub-system and system level components. It is the purpose of these reviews to allow a thorough analysis of the design to determine deficiencies, oversights, violation of standard industry practices, etc. Additionally, the reviews provide a necessary forum for the technical community to exchange ideas to enhance system performance and increase

operational effectiveness. As a result, it is imperative that the user participate in these reviews to deepen his understanding of the weapon system's design and expected operational performance. The user should also use this process to ensure that design changes due to operational test results are being incorporated.

Until the completion of the formal design review process, the contractor is normally free to make changes to the system's design and hardware/software configuration (5:3-1). This allows maximum flexibility in searching for the proper combinations to meet performance requirements. However, as the selected weapon system for full scale development matures, stringent controls must be placed on the system's design or configuration. This is necessary to properly integrate the multitude of activities which are occurring and, more importantly, to reduce costly design changes once the hardware has been manufactured. The key to proper configuration management is timing (15:--). If the design is placed under configuration control prematurely, the performance of the weapon system will suffer or the required design changes will be made which could affect hardware delivery schedules, support equipment, software, logistics, etc. These type changes are normally very costly. On the other hand, if configuration control is excessively delayed, there is a tendency for "goldplating" by the engineering community. This is the processing of changes which enhance a system's performance but are not necessary to meet requirements (15:--). As a result of these constraints, the program office must decide at some point after the CDR to place the system under configuration control. This is normally accomplished by elevating change approval authority to only the program manager or his/her designee (5:3-1). The focus of the SPO in this process is to minimize the changes after configuration control is invoked to maintain its "contracted" cost and schedule baselines. The program manager will challenge each change request for its necessity and priority (5:3-1). The user also has a vital role in the configuration management process. His operational testing results are key in determining the configuration control timing. Operational deficiencies uncovered during this testing are much easier and less costly to correct prior to configuration control. Once configuration control is invoked, the user should provide an "operational view" of each change request with a recommendation for its necessity and priority (14:IV-4). This view is essential in providing the program manager the proper information for avoiding uneducated decisions due to lack of operational experience. In this manner, only the right changes will be incorporated as the design matures into the production model.

As the weapon system nears the production phase, the tempo of the logistics support process increases. Back in the concept exploration/definition phase, the SPO and the user began work on an Integrated Logistics Support Plan (ILSP) which details logistics support objectives, resources, management assumptions, degree of competition, maintenance approach, constraints, post-production support requirements, etc. (1:--). In the full scale development phase, the updated plan is used to define the logistics support and initiate acquisition. The SPO is responsible for the management of this process to ensure that the proper training resources, documentation, support equipment, spares parts, repair kits, etc. are acquired. The user is responsible for expanding the logistics section of the SORD for incorporation into the ILSP. With the SPO working closely with the user, the logistics support acquisition, system design specifications development, and operational support concepts refinements will interplay smoothly to provide a system package ready for Milestone III - Full Rate Production/Deployment decision.

The User and the Program Office - Full Rate Production/  
Deployment to Initial  
Operational Capability  
(IOC)

The production and delivery of a "performance proven" system, on schedule and on budget, requires substantial communication between the SPO and its user. In addition, it is normally during the full rate production/deployment time phase that the program management responsibility transfer (PMRT) between the SPO and the supporting command occurs. As will be examined later, the PMRT significantly changes the relationship between the SPO and the user. The actual weapon system deployment will exercise all of the interfaces between the SPO, user, and supporting command to the maximum and necessitates careful planning and proper management.

During the production phase, the SPO should provide production progress information, identification of manufacturing failures which could impact IOC, required configuration change status, and logistics support acquisition status (6:4). The user should use the information provided by the SPO to integrate the assignment and training requirements of its personnel to operate and maintain the weapon system upon deployment, ensure the command's resource readiness for accepting the new weapon system, and coordinate on the deployment phasing to ensure proper logistics support (14:V-10). It is also during this phase that the user is conducting follow-on operational

testing (FOT&E) with the initial production articles. The results of this testing are provided to the SPO to determine if any technical specification requirements need to be altered to enhance operational effectiveness. At this point, the SPO continues to exercise authority to make engineering and/or configuration changes because it still maintains overall program management responsibility for the weapon system (9:1). However, as the system matures in production to an appropriate point, this responsibility will be transferred to the supporting command.

As described in AFR 800-4, Program Management Responsibility Transfer (PMRT) is the transfer of overall program management responsibility, including engineering responsibility and configuration management responsibility, from the implementing command to the supporting command (9:1). The regulation goes on to detail that, "PMRT should be planned to occur when the implementing command acquisition management task is sufficiently completed to preclude duplication of acquisition management capabilities in the supporting command" (9:1). As can be seen, there is little guidance on exactly when the PMRT should occur. This is due to the nature of the program management responsibility changing gradually from that of acquiring a "new" weapon system to one of sustaining an existing weapon system's engineering and configuration effort. In order that this transfer proceed in an efficient and timely manner, several key management actions must occur. Initially, the SPO program manager establishes a Transfer Working Group (TWG) which will plan the PMRT. The TWG, which is established early in the Full Scale Development phase, usually consists of representatives from the implementing command, supporting command, the using command, and other participating commands. The TWG establishes a PMRT milestone date which will mark the official review of all transfer preparations and provide an actual date for the PMRT. A transfer agreement is signed between the SPO and the supporting command to detail which residual tasks will be accomplished by the implementing command after PMRT. Basically, the supporting command assumes all program management responsibility including engineering and configuration management responsibility. The SPO continues to fund and perform residual tasks while providing any engineering development support detailed in the transfer agreement (9:2). The user must now establish new interfaces with the supporting command which will replace the existing interfaces with the SPO. These interfaces include test evaluation, production reports, engineering changes which affect operational effectiveness, and significant configuration changes. The relationship which is established between the supporting command and the user for the new system will normally continue for the life of the weapon

system. While establishing new relationships with the supporting command, the user is also preparing for the deployment of the system and attainment of initial operational capability (IOC).

The initial operational deployment begins when the production items are delivered to the operational units of the using command (14:V-11). The user normally uses the first delivery items for personnel training, operational testing to further develop tactics, and overall readiness assessment. As the user achieves the required resources, experience, and training, IOC is achieved. At IOC the user assumes full operations and maintenance responsibility, and property accountability (9:2). The interfaces which are now established between the user and the supporting command will normally continue for the life of the weapon system. The SPO which brought the weapon system into the US inventory slowly transitions to a support office for major modifications only.

### Summary

In order for the USAF to avoid the "horror stories" which have plagued weapon system acquisition, clear communication is necessary across the user/SPO interface. As described above, this interface is indeed multi-faceted and complex. In each phase of the acquisition process, both the SPO and user have vital communication roles to play to ensure the successful deployment and operation of a modern weapon system. Beginning with the initiation of the acquisition process in the concept exploration/definition phase, the SPO must fully understand the operational needs of the user in filling a "gap" in his force capability as defined in the SON. The SPO must also comprehend the manner in which the weapon system is to be fielded and the resources the user has to maintain and operate the system as depicted in the SORD. With this information, the SPO defines the acquisition strategy to be followed in the development of the new system and the milestone schedule necessary to achieve the user's required initial operational capability (IOC) of the system. The SPO and the user enter into a "contract" with this information and the program is formally baselined.

In the concept demonstration/validation phase, the user/SPO communication is centered on the reduction of both technical and schedule risk in deciding which system alternative to carry into full scale production. It becomes essential for the user to participate in the contractor source selection process for their operational expertise and perspective. It is also during the concept demonstration/validation phase that the development and operational testing programs are initiated with both user and SPO personnel

participating. Again, it is imperative that the two organizations share test data and results to ensure proper design refinement based on operational considerations. The bottomline in this phase is for the SPO and user to communicate properly to guarantee the best possible decision is made in selecting the system alternative for full scale development.

The SPO and user must interface across a broad range of areas during full scale development and initial production. The user should become involved in the design development characterized by the preliminary design reviews and critical design reviews of each facet of the weapon system. This knowledge is invaluable in the development of the user's training profiles and programs to support the system's operational deployment. In addition, the user and the SPO must communicate in the system's configuration management process. In this arena, the user plays a vital role in providing an operational perspective for configuration change requests decisions. The other major area of SPO/user interface in this phase is the logistics support planning and acquisition. The SPO and user must work closely to ensure that the weapon system has the proper logistics support objectives, resources, maintenance approach, etc. These items are defined and detailed in the ILSP. Using this information the user updates the SORD and the program enters the full rate production/deployment phase.

With the acquisition process entering the full rate production/deployment phase, the user and SPO begin to drastically change their relationship. With the weapon system nearing its full maturity, the program undergoes PMRT which changes the role of the SPO from program control to program support and intensifies the role of the supporting command to conduct engineering and configuration management for the life of the system. The user must establish new interfaces with the supporting command for the information flow necessary for sustaining operations and maintenance of the weapon system.

Across the broad spectrum of the system acquisition process, the user and the SPO must establish the necessary interfaces and communicate effectively. The requirement for this effective communication was highlighted in July, 1987, by the Commander of Air Force Systems Command when he wrote,

The basic mission of AFSC is to support the using commands. To accomplish this, we must be close to our customers. This concept must permeate our management of programs, our testing of systems, and our exploration of technologies. It is imperative that we coordinate our actions and decisions with the using commands, but that alone is not sufficient



to get the job done. We must fully understand their requirements and anticipate their needs....

Procedures, paperwork, fancy strategies, and low-cost solutions mean nothing if the system does not perform or does not meet the users' needs (12:1-2).

## Part Two

### ANALYSIS AND RECOMMENDATIONS

In the preceding article, the roles and responsibilities of the SPO and user in a system acquisition were detailed and the criticality of proper communication across this interface established. This section will describe several ways to improve this communication and therefore enhance the overall effectiveness of the system acquisition process.

The first priority in improving the communication between the SPO and the user lies in the area of training and education. As detailed in the preceding article, one of the first duties of SPO personnel is to understand the user's operational requirements in the development of any new weapon system. Understanding operational requirements means understanding not only the mission "gap" that the new weapon system is being designed to fill, but also comprehending the environment in which the system will be used, the resources available to the user for operation, maintenance, and support of the system, etc. This comprehension on the part of SPO personnel and particularly the program manager is essential in making the proper trade-off decisions between cost, schedule, and performance as described in the concept exploration/definition section of the preceding article. Similarly, user personnel must have a clear understanding of the acquisition strategy used by the SPO personnel, the cost constraints on the system acquisition, technical risks inherent in the design of the system, etc. This understanding by user personnel provides a "big picture" perspective in dealing with weapon system performance trade-offs, system deployment and logistics support planning, etc. In order to accomplish both formal and informal cross-training of personnel, several avenues are available. In the way of formal training, the Air Force Institute of Technology (AFIT) offers several courses in system acquisition management which would be invaluable to using command personnel to enhance their understanding of the acquisition process. These courses (AFIT SYS 100, 200, 300, and 400) run the spectrum from acquisition familiarization to in-depth comprehension. Using command personnel assigned to interface with the acquisition community should be required to attend some or all of these courses depending on their duties. Informally, SPO personnel could observe and, if

possible, participate in the various exercises conducted by the using commands. These visits with the user community would offer the SPO personnel an appreciation of the operational environment in which the new system must perform. For example, personnel from a new fighter aircraft SPO could participate in a "Red Flag" deployment and operation to better understand the constraints placed on the pilots and maintenance personnel in combat situations. This information would help the SPO personnel in the decisions which would be made regarding the operability, maintainability, and reliability of the new weapon system.

Another opportunity for improving SPO/user communications is the participation by user personnel in the many reviews and meetings conducted by the SPO. As detailed in the preceding article, there are several formal milestone reviews in the acquisition process which require the attendance of using command personnel. However, there are a multitude of reviews and meetings which do not specifically require the presence of user personnel. It is in this area that the user needs to ensure participation. For example, the design reviews held in the full scale development phase are valuable forums for the user to understand the design philosophy of the weapon systems. In addition, the user can use the reviews to provide an operational perspective for the design decisions made by the SPO personnel. To deepen his/her understanding of the SPO's acquisition strategy, the user could participate in the business management reviews conducted on a regular basis by the program manager.

One final recommendation to enhance the effectiveness of the SPO/user communication is to better document the interface between the SPO and the user. As described in the previous article, the roles and responsibilities of the SPO and the user are well documented in the various AF and AFSC regulations, but there is little guidance in the regulations regarding the interface between the SPO and the user. In July, 1987, General Bernard Randolph initiated this process by writing AFSCR 550-10 entitled "Focus on the User". This Commander's Policy regulation defined broad guidance for the interaction between the SPO and the user. This initiative should now be further developed with the creation of additional documentation depicting the required user participation in SPO activities, mandatory visits of SPO personnel to various user activities, required information to be shared between the SPO and user, etc.

In today's acquisition environment of complex weapon systems and costly components, a "team spirit" must prevail between the SPO and the user. This spirit can only be achieved through knowledge of each organization's objectives, constraints, and resources which in turn builds an atmosphere of mutual respect. This knowledge can be attained through

formal training, sharing of experiences, participation in decision-making, and a clear definition of required interaction for both SPO and user personnel. By incorporating the recommendations outlined above, the USAF can take a positive step to ensure that a team spirit does exist in the acquisition community. The SPO and user must work together closely to meet the formidable challenges of leading tomorrow's Air Force.

# BIBLIOGRAPHY

## A. REFERENCES CITED

### Articles and Periodicals

1. Arnold, Wilbur V. and Richard M. Stepler. "Balancing on the Technical Manager's Tightwire." Program Manager Magazine, Vol. 13 (January-February 1984), pp. 24-30.
2. Hamilton, John R. "An Introduction to Army Operational Test and Evaluation." Army Research, Development & Acquisition Magazine, (May-June 1983), pp. 4-6.

### Official Documents

3. US Congress: Senate Committee on Armed Services, Subcommittee on Defense Acquisition Policy. The acquisition findings in the report of the President's Blue Ribbon Commission. Washington, DC: Government Printing Office, 1986.
4. US Department of the Air Force. Acquisition Program Management. AF Regulation 800-2(C2). Washington, DC: Government Printing Office, 1986.
5. US Department of the Air Force. Configuration Management. AF Regulation 65-3. Washington, DC: Government Printing Office, 1974.
6. US Department of the Air Force. Engineering for Defense Systems. AF Regulation 800-3. Washington, DC: Government Printing Office, 1977.
7. US Department of the Air Force. Operational Needs. AF Regulation 57-1. Washington, DC: Government Printing Office, 1985.
8. US Department of the Air Force. System Operational Concepts. AF Regulation 55-24. Washington, DC: Government Printing Office, 1986.
9. US Department of the Air Force. Transfer of Program Management Responsibility. AF Regulation 800-4. Washington, DC: Government Printing Office, 1982.

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## CONTINUED

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10. US Department of the Air Force: Air Force Business Research Management Center. Major system source selection training evaluation. Wright-Patterson AFB, Ohio. 27 April 87.
11. US Department of the Air Force: Air Command and Staff College. The User's Role in Weapon System Acquisition Management. Air University Press. Maxwell AFB, AL. May 1974.
12. US Department of the Air Force: HQ AF Systems Command. Focus on the User. AFSC Regulation 550-10. Washington, DC: Government Printing Office, 1987.
13. US Department of Defense Directive 5000.1. Major and Non-Major Defense Acquisition Programs. Washington, D.C.: Government Printing Office, September 1987.

### Unpublished Materials

14. US Department of the Air Force: HQ Tactical Air Command. "Introduction to the TAF Requirements Process." Primer for TAC/DCS Requirements staff officers, May 1985.

### Other Sources

15. US Department of Defense: Defense Systems Management College, Technical Department, Program Management Course Curriculum 84-2. Jul-Dec 1984.

## B. RELATED SOURCES

### Official Documents

US Congress: Joint Economic Committee, Subcommittee on Priorities and Economy in Government. Hearings on The Acquisition of Weapons Systems. Part 5. Washington, DC: Government Printing Office, 1972.

## CONTINUED

- US Congress: Joint Economic Committee, Subcommittee on Priorities and Economy in Government. Hearings on The Acquisition of Weapons Systems. Part 6. Washington, DC: Government Printing Office, 1973.
- US Congress: Joint Economic Committee, Subcommittee on Priorities and Economy in Government. Hearings on The Acquisition of Weapons Systems. Part 7. Washington, DC: Government Printing Office, 1974.
- US Department of the Air Force: HQ AF Systems Command. Command Goals. AFSC Regulation 550-2. Washington, DC: Government Printing Office, 1987.
- US Department of the Air Force: HQ AF Systems Command. Give the User Value. AFSC Regulation 550-11. Washington, DC: Government Printing Office, 1987.
- US Department of the Air Force: HQ AF Systems Command. Acquisition Team Concept. AFSC Regulation 550-24. Washington, DC: Government Printing Office, 1987.
- US Department of Defense Directive 5000.2. Defense Acquisition Program Procedures. Washington, D.C.: Government Printing Office, September 1987.

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